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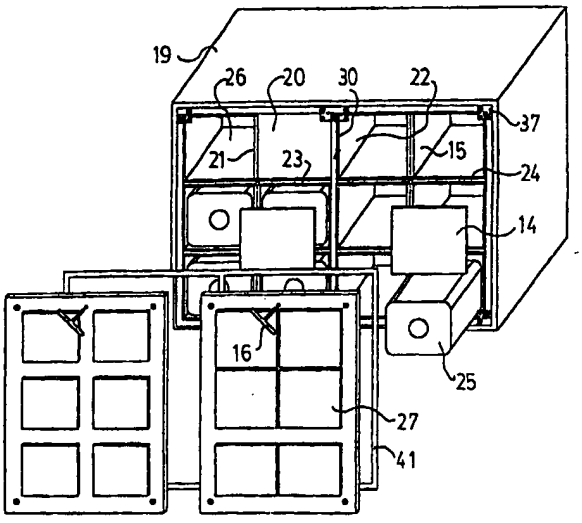

(57) Abstract

A columbarium (10) as a slab form construction holds ash boxes (25) or urns (12). Construction is with edge connected panel material (52, 53, 54) in box form with open fronts to which is applied a facing panel (39, 128). The panel material is a durable plastic material and corner connectors (41) are fitted to mount facing panel (39). The durable plastic material is PVC which is foamed with a solid skin. A lining, either internally or externally, is in an acrylic based material with mineral filler. Slab form modules stacked and joined to provide multiple niches (20) into which ash boxes (25) may be loaded. Partitioning (21) subdivides the storage volume. The columbarium may be glass fronted. The glass front may be framed and screwed into module edges.

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TITLE : "COLUMBARIA, NICHE WALLS, AND URN CABINETS"

FIELD OF THE INVENTION

THIS INVENTION relates to columbaria and the like, niche walls and urn cabinets, and in particular to materials, methods and/or elements which may be used in their construction.

Hereinafter columbaria and columbarium are used to denote the range of structures, for internal and external use, for use in cemeteries and elsewhere, including units for holding the remains of only one person, through cabinet like units and external walls storing multiple remains.

BACKGROUND TO THE INVENTION

The process of cremation ends with remains usually loaded into an ash box which is typically loaded into a niche in a wall. The remains are comprised of sizeable pieces of bone material, down to a fine ash, after going through a processor, a machine that reduces the cremated remains, the remains are loaded into an ash box.

It is known to construct a wall from bricks, with niches in which ash boxes may be packed. Typically a memorial plaque is applied over the front of each niche. These walls are relatively expensive to produce. The number of niches which can be established per unit of wall area is restricted when the wall is made from bricks because sufficient brick must be in place to establish a stable wall. In recent times the common brick cemetery wall has fallen from favour with the public in preference to a solid granite wall. Both have their problems.

A granite cemetery wall typically comprises a block of granite in which are formed niches by use of a diamond type, hole saw, which saw is used to cut into the block, typically at both sides. When a niche is to be used, the cylindrical core, left by the hole saw, is broken away and removed. The granite walls are heavy and expensive and require instillation by cranes, which inevitably damage lawns and

gardens, and can be difficult to access established areas of a cemetery.

Recent developments involve construction of columbaria using moulded modular elements, stacked and interconnected as is seen in US 4614066. A disadvantage of moulded modular units is their fixed size. These cannot accommodate different cultural expectations except by use of multiple moulds or use of a single mould which will be oversized for ethnic groups needing smaller niches. Cabinet style construction techniques have been proposed as in US 5195812 which discusses a range of techniques including sheet concrete constructions and poured concrete. A disadvantage of the '812' concrete panel constructions is the need of additional elements such as tie rods to gain structural integrity. Particular construction fittings have been developed for the cabinet structures, such as fittings to hold front slabs as seen in US 4644711 and US 4523413.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide methods, structures, and processes of assembly by which to establish columbaria, niche walls, urn cabinets, and the like which work effectively with a desired size and number of ash boxes, urns and other like type storage vessels.

It is another object of the present invention to provide the aforesaid in manners which may be more cost effective in respect of the materials which might be used.

It is a further object of the present invention to provide the aforesaid in forms which may offer a greater density of cells per unit area over brick and granite walls and which may allow greater flexibility in the manner of their use.

DISCLOSURE OF THE INVENTION

The invention achieves its object in the provision of a

columbarium comprising

a slab form module which is adapted to receive an ash box therein, in use;

characterised in that

the slab form module is constructed of edge connected PVC based material lined internally, or fitted externally, with at least one panel of cladding in acrylic based material.

The invention enables columbarium to be shipped as modules for assembly into walls and the like at the designated site. Shipping costs might be reduced by shipping the system in flat pack form with the modules assembled at their destination. The columbaria of the invention derive structural integrity from the fabricated module itself. It does not require any further stability such as from tie rods, bracing, frames, and or walls. There is no need for niche liners as all the materials are impervious to moisture with a hard smooth appearance.

The PVC material is preferably a hard coat PVC sheet with a firm impervious outer skin with the advantage that it will not rot. Such material can have a low specific gravity, typically 11.25 kg/m^2 at a thickness of 15mm. This material is advantageous in being self extinguishing when lit. Such material is advantageous in being easily worked, being non-corroding, in having a low thermal conductivity, in being UV stabilised, in being termite resistant and in having a high strength to weight ratio.

The acrylic polymer sheeting is obtainable under the trade mark Corian which is a dense mineral filled methylmethacrylate. Such material is solid, homogenous and impervious. It has exceptional weathering properties. It has a polished finish and does not delaminate. It has a higher tensile strength than granite and greater impact resistance. It has high thermal shock resistance. It is easy to clean and maintain. A 12mm sheet weighs 23kg/m^2 whereas granite weighs

36kg/m^2 . At 12mm granite does not have the tensile strength and at the recommended minimum thickness for granite, 15mm the weight of granite is 45kg/m^2, double the weight of Corian, and still without the same tensile strength. Weight is a significant factor. Adding bronze plaques can add 3.3kg to the weight of a removable I to a niche. A reduction in the weight of the material of the front panel is desirable to benefit the periodical handling by cemetery staff.

In a preferred form the columbarium is one wherein the slab form module is one of a number of prefabricated modules and two or more such modules are stacked and joined to provide niches into which ash boxes may be loaded, said prefabricated module being such that at least two opposed peripheral walls define an open fronted enclosure establishing a storage volume therein, at least a pair of oppositely disposed location means are respectively operatively associated each with one of said two opposed peripheral walls and adapted to removably engage with and locate there between a partition means, and at least one partition means extends across said storage volume, removably engaged with, and held by, in use, said location means, effective to subdivide the storage volume, and the opposed peripheral walls have, mounted thereto, retention means by which to mount one or more cover means over the open face of said prefabricated module, extended, in use, across the storage volume. Preferably the columbarium is one wherein the prefabricated module is one in which at least one partition means has additional retention means associated therewith to enable further additional partition, extended from a peripheral wall thereto, in use, to further subdivide the storage volume. Advantageously the columbarium is one wherein the prefabricated module there is provided a spacing means externally of said peripheral walls, effective to allow for dimensional variation between modules, creating a gap between adjoining modules, in use, in which a facing strip may be located.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described with reference to various preferred embodiments which are seen in the accompanying drawings in which:

FIG. 1 is an elevation of a columbarium in accordance with an embodiment of the invention;

FIG. 2 is an exploded view of a module in accordance with the invention which can be used to construct a columbarium as in FIG. 1;

FIG's. 3 and 4 show detail of the construction and how face plates may be added to the modules of the invention , such as is seen in FIG. 1;

FIG's 5 and 6 show detail of a corner of a cover or face plate as might be used in a cemetery wall such as is seen in the embodiment of FIG. 4;

FIG's. 7 and 8 are a front elevation and sectional view of a 4 by 4 cell module in accordance with an embodiment of the invention;

FIG's. 9 and 10 are a front elevation and sectional view a single niche module in accordance with an embodiment of the invention; and

FIG's. 11 and 12 are detailed views showing a means by which to fit a glass front to niche in accordance with the invention.

PREFERRED EMBODIMENTS

In FIG. 1 is seen an internal columbarium in accordance with the invention. The wall 10 can be constructed or erected using a plurality of prefabricated modules as will be described below. In this embodiment is shown two different sized modules in use in realising the desired overall dimension of the wall. It will be appreciated that the modules may be the same or different in size , or that a greater number of modules, of smaller size might be used. The exact number and size of modules will be a question of materials and strengths, along with

questions of efficient handling during transport of the modules and during the final erection of the wall. The internal volume of the modules may be segmented or subdivided by a suitable means such as partitions, to produce or create therein a number of storage volumes or niches(described in greater detail below) such as in the closed, six box niches in modules 11, and 13. The different sized, open view modules such as 12may be closed with a glass front. As will be seen below in greater detail, the partitions may be made to be selectively inserted into the modules in such a manner that they remain removable so that a larger cell may be created, as desired, in which to accommodate more than one ash box.

In FIG. 2 is seen in an exploded view a module 19 which is subdivided into niches such as niche 20, formed between partitions such as 21,22,23. Partitions may be grooved, as can be the walls of a module, effective to locate or engage with other partitions or dividers, in a similar removable manner. An ash box 25 is shown as it would slot into a niche. An array of four related ash boxes might be located behind a grouped plaque 27, and these could be stacked into a larger cell created by removal of partitions. Such larger cells are simply created by omitting to load, or removing them if loaded, partitions of the size of 15,24, which may be normally employed or used to subdivide or reduce a four cell size volume to four separate, one, or basic, ash box niches. A removable face or cover plate 39 may be provided with memorial or name plaques 27 fitted thereto. Plate 39 may be fitted with a sealing strip 41 to ensure airtightness and weather-proofing. Individual niches may be closed off with a plate such a 14. Niche 20 is seen with such a closure in place. Plates such as 37 may be provided as a means by which to fix face plates 39 (described in greater detail below). A key 16 may be screwed into face plate 39 to assist lifting on removal or re-application.

The plaques may be fitted to the front plate with an acrylic foam tape to provide a no screw means of fixing. This offers high bond

strength in an instant bond to reduce labour in plaque application. It provides compensation for thermal expansion of the bonded parts. It will seal and bond in extreme environments and is UV stabilised. It is cleaner to use than are other techniques such as use of silicone sealants.

Gaskets used in the system might be closed cell EPDM rubber foam with low compression and high strength adhesive backing. Such material has low migratory plasticizers to be compatible with other plastics which might be used in the system. It is non-toxic and flame retardant with good resistance to high temperature. It is a robust tear resistant and abrasion resistant material which is also UV stabilised.

In FIG's. 3 and 4 is seen a front and side sectional views in which a module 32 is fitted with cover or face plate retention means which can be brackets such as 35, held thereto by a screws such as 36. This bracket 35 can be used to hold or secure a box enclosure means or face plate 39 by means of a plurality of suitable securing means, such as bolt 38 engaged with a threaded hole in bracket 35. A sealing or facing strip 33 may be fitted, as shown. Module 32 may be formed by edge connected panels 51 to 55. The module 32. External cladding 55 may be added as will be explained below. A module as illustrated may receive cladding on all external faces (described in greater detail below). Alternately, a number of unclad modules may be interconnected and the assembly might be clad externally. The module 32 may be subdivided as shown with dividers 56,57 slid into rebates in side walls 51,53. Further subdivision is possible with additional dividers, such as 56 slid into rebates in top panel 52 and divider 56. The periphery of each niche may be rebated as at 57 to take a cover plate 58 and these rebates may be provided with a seal. The face plate 39 and the external cladding can be an acrylic polymer as described above. The module panels and dividers can be in a PVC as described above. The panels might be joined with use of one or both of mechanical connectors such as stainless steel screws and chemical bonding such as with a solvent welding cement as

will be known to those skilled in the art. The face plate brackets 35 are ideally in stainless steel and may be held by screws acting directly into the PVC. It will be clear to those skilled in the art that the above described structure might be applied to a module with a range of niche dimensions and a range of modules with different numbers of niches from one niche upwards.

In FIG's. 5 and 6 is seen a detailed view of a corner 40 between four modules, from the front, with a cover or face plate bracket 41 fitted thereto. Adjoining modules may be interconnected by suitable means such as screw 42. The brackets 41 may be fitted by any suitable means such as by screw connectors 43 typically located as shown at edges. Elements 41,42 and 43 are also seen in FIG. 6. A connector such as a bolt 38 may be passed through the face plate 39 to a screw hole in bracket 43. The bracket 41 is a bracket to operate at a corner between four modules. It will be clear to those skilled in the art that a half form of the bracket 41 can be made to work at the outer join between two modules and that a quarter version will work at an outer corner of a corner module to an array. The screws 43 may tap into the material of the foam PVC. The bolt 38 may locate in a recessed hole to which a patch may be applied to cover the bolt head.

It will be clear to those skilled in the art that the modules may be in other forms such as a 4 by 4 cell module. The modules may have grooves or other like type supports for dividers on or in its end wall in which to slide, slot or otherwise support partitions. A face plate may be held by a variety of brackets. Ash boxes may be in their own basic niche as defined by partitions, alternately ash boxes may be stacked in a larger niche, which larger niche can be created by omitting partitions. In use, the modules may be stacked together to form a number of different wall plans either internally or externally. Larger spaces might be provided for a family of ash boxes, stacked together. Their cell might be created from two or more basic cells by omission of a one or more partitions. A material such as PVC achieves a better result in that such a material is

easy to work, enabling last minute adjustments to achieve a neat sliding fit. Any desired dimensional change is readily achieved by simple working of the material using standard woodwork tools and techniques.

In use the modules may be stood off a base and a decorative skirting can be provided. Gaps between facing sheets can be filled with a plastic or metal (such as aluminium) shim.

In FIGS. 7 and 8 is seen a glass fronted module wherein glass fronts 128 may provide a clear view revealing urn 129. Such a module can be assembled as above and the glass front may be applied in a suitable frame 125 and fitted with screws 126 (such as tamper proof screws). The lining 127 of the cells may be with a decorative panelling. Instead of a separate framed glass front to each niche, the whole face of the module can be covered with a framed array of glass panels. A rebate 131 can carry a lighting cable to deliver electricity to a small light globe at 130 to illuminate the niche it is fitted to. The glass fronts might be attached using a moulded plastic corner stake which accommodates a concealed tamper proof screw fitting by way of a push cap.

FIG's. 9 and 10 show a 1 x 1 module assembled as above and with a glass front of the previous kind. These and the foregoing may operate in conjunction with other arrays to enable packing into an internal space to take up a maximum of the space available.

In FIG's. 11 and 12 is seen detailed views of the frame 137, fitted by screw 138 to panel 139 of a module to which there is a glass front 140. Any of the aluminium extruded frame techniques may be applied in construction of the fronts with a frame 150 and glass gasket 160. In FIG. 11 screw 138 is recessed and hidden behind push cap 159. The screw 138 may be screwed directly into the PVC sheet 139 or onto a plastic or other material insert 170. A plastic or brass expansion insert is desirable if the glass front is likely to be removed periodically, to avoid stripping the thread cut into the PVC. In FIG. 12 is seen a corner at which four frames to glass fronts nest. Frame 150 holding glass 140 is held by

a bolt hidden beneath push cap 159. The frame may comprise frame elements 162,163 held at the corner by corner piece 161.

In the above preferred embodiment adjoining modules were attached to each other with screws. Solid fronted systems might be screwed. Glass fronted systems may be fixed using double sided tape (so as not to spoil the Corian liner). Use of PVC material enables other joining techniques such as gluing or by use of double sided tape. A silicone modified urethane sealant might be used giving neutral cure. Such material is able to be sawed, planed, and machined using standard wood working and cabinet making equipment. Dimensional accuracy is readily maintained with PVC based materials as opposed to cement based sheets and cast systems. Dimensional accuracy is important to forms of assembly involving the stacking of modules. The modules are light and the cranes required for other systems are not needed.

CLAIMS.

1. A columbarium

comprising

a slab form module which is adapted to receive an ash box therein, in use;

the slab form module being formed from edge connected panel material in box form with an open front to which is applied a facing panel;

characterised in that

the panel material is a durable plastic material which is glued or screwed to form the box.

2. A columbarium as claimed in claim 1 wherein corner connectors are fitted thereto to mount the facing panel.

3. A columbarium as claimed in claim 1 wherein the durable plastic material is PVC which is foamed with a solid skin.

4. A columbarium as claimed in claim 1 wherein the panel material is lined either internally or externally with an acrylic based material with mineral filler.

5. A columbarium as claimed in claim 1 wherein the slab form module is a prefabricated module and two or more such modules are stacked and joined to provide niches into which ash boxes may be loaded, in use, said prefabricated module being such that:

at least two opposed peripheral walls define an open fronted enclosure establishing a storage volume therein;

at least a pair of oppositely disposed location means are respectively operatively associated each with one of said two opposed peripheral walls and adapted to removably engage with and locate there between a partition means; and

at least one partition means extends across said storage volume, removably engaged with, and held by, in use, said location means, effective to subdivide the storage volume; and

the opposed peripheral walls have, mounted thereto, retention means by which to mount one or more cover means over the open face of said prefabricated module, extended, in use, across the storage volume.

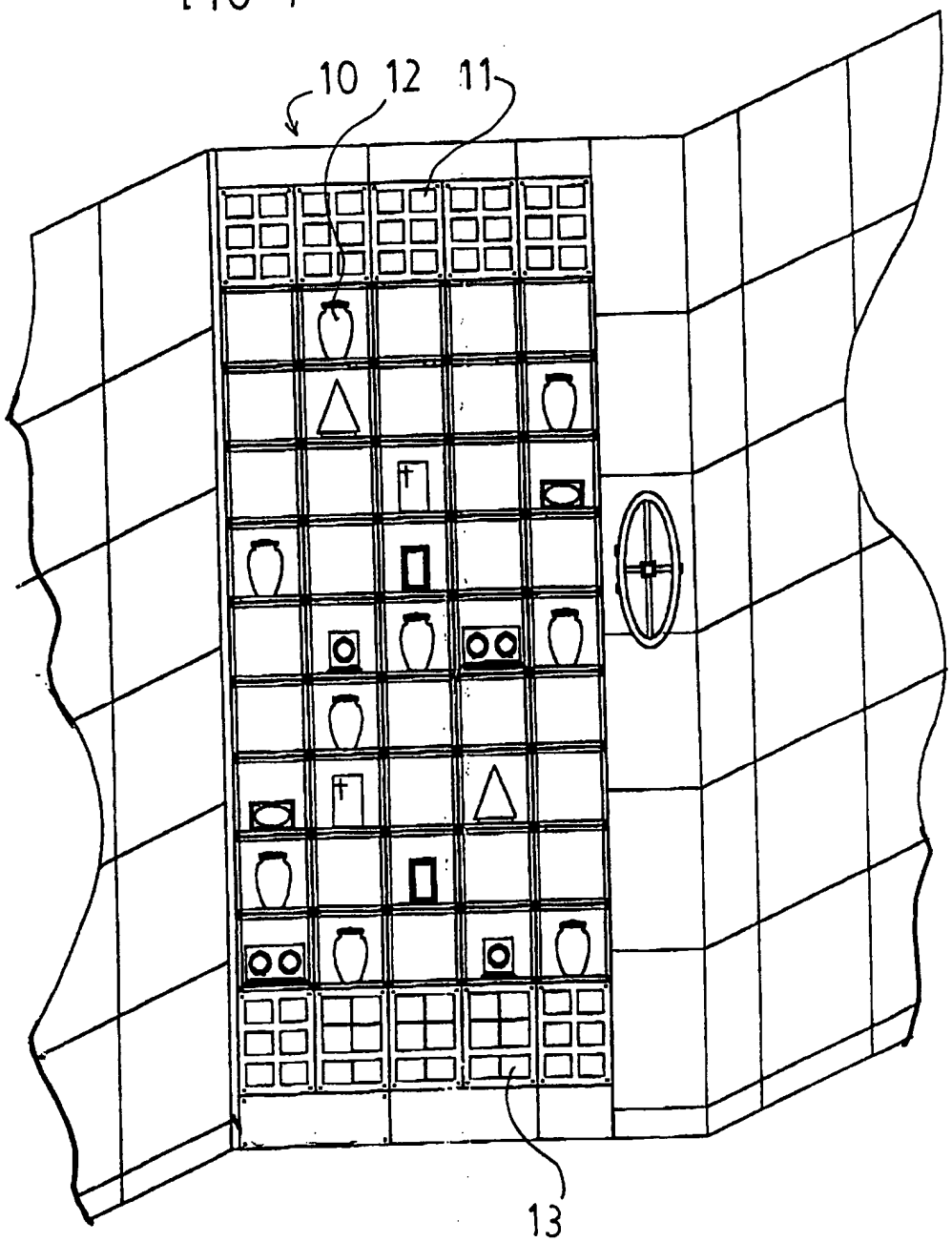
6. A columbarium as claimed in claim 5 wherein the prefabricated module is one in which at least one partition means has additional retention means associated therewith to enable further additional partition, extended from a peripheral wall thereto, in use, to further subdivide the storage volume.

7. A columbarium as claimed in claim 6 wherein the prefabricated module is one wherein there is provided a spacing means externally of said peripheral walls, effective to allow for dimensional variation between modules, creating a gap between adjoining modules, in use, in which a facing strip may be located.

8. A columbarium as claimed in claim 1 wherein the columbarium is glass fronted.

9. A columbarium as claimed in claim 8 wherein the glass front is a glass sheet in a frame which is screwed into module edges.

FIG 1



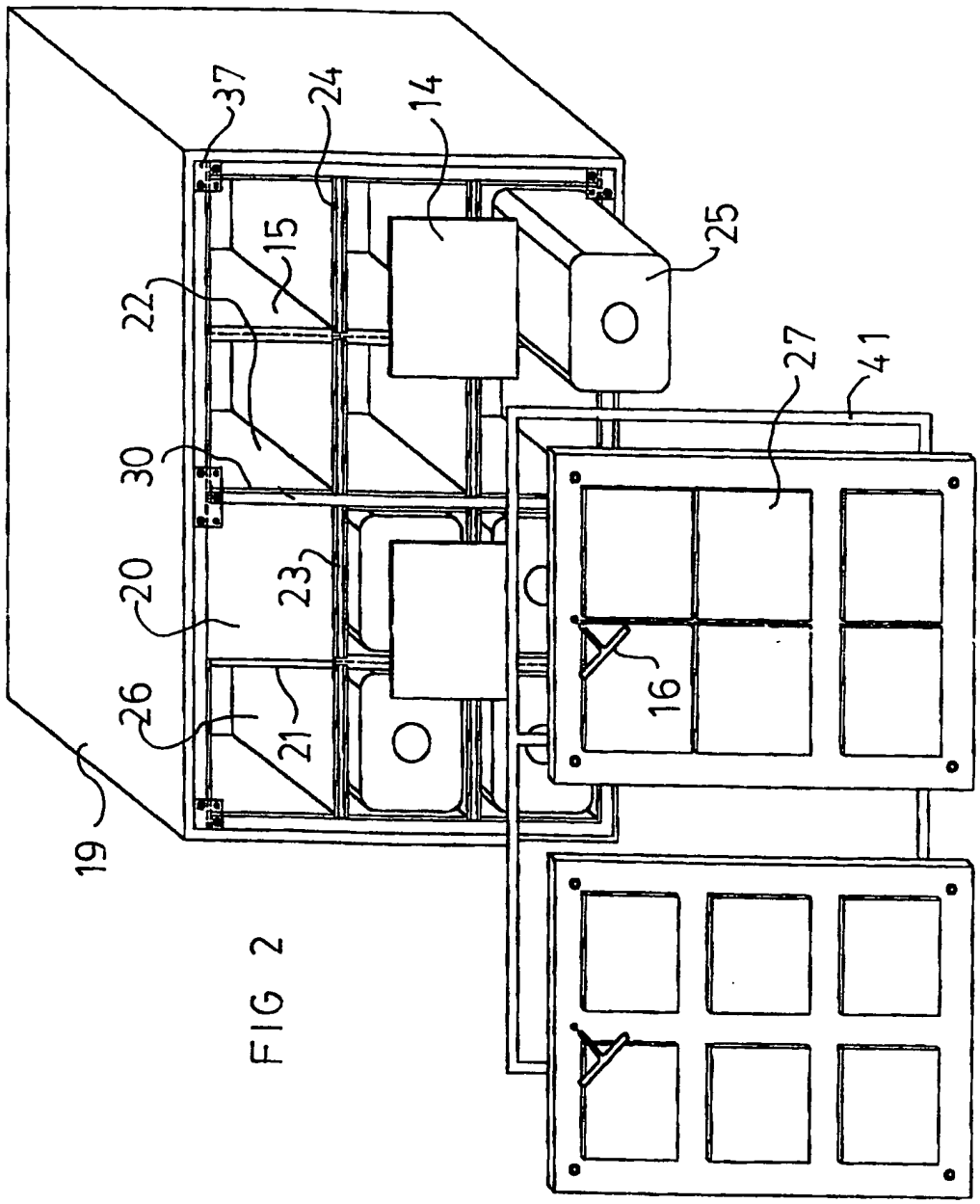


FIG 2

FIG 3

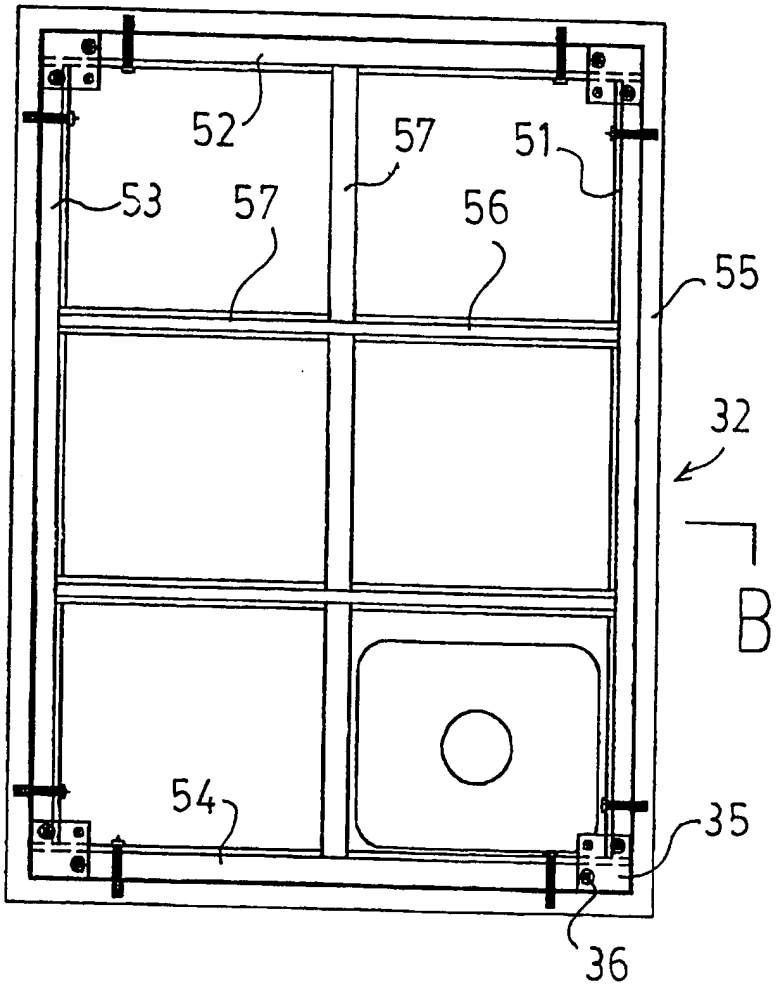
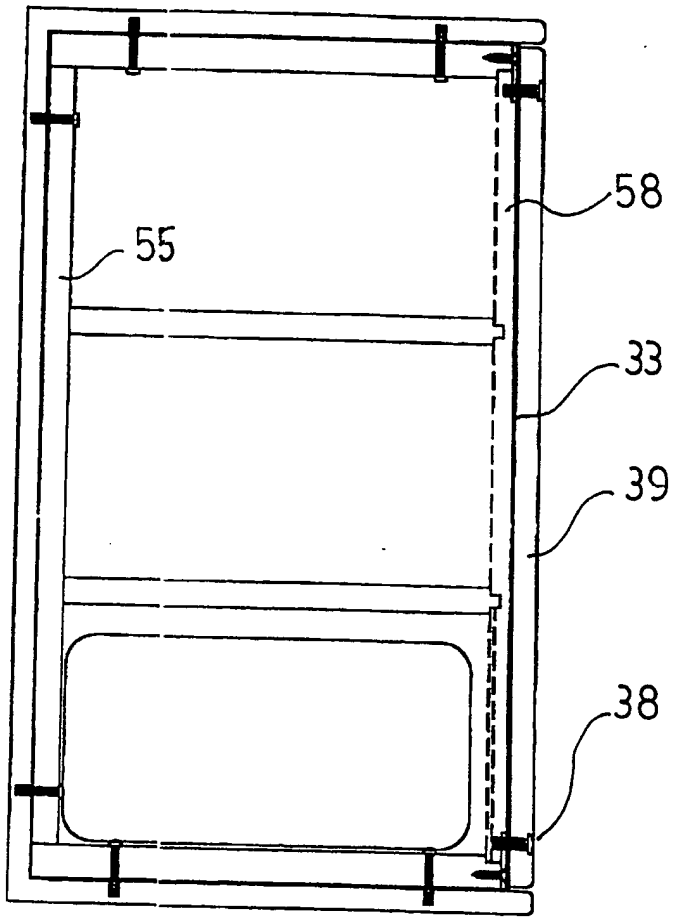


FIG 4



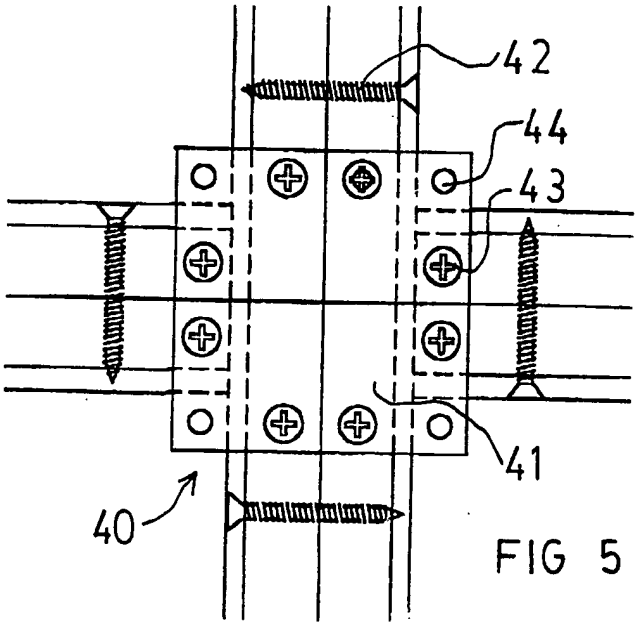


FIG 5

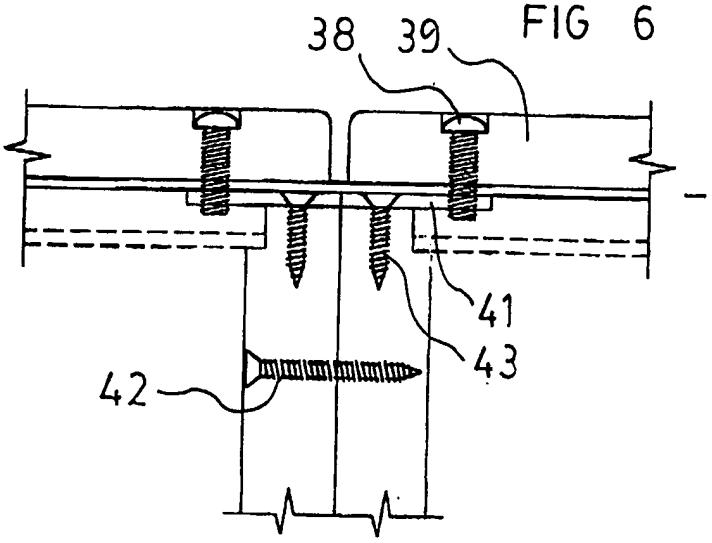


FIG 6

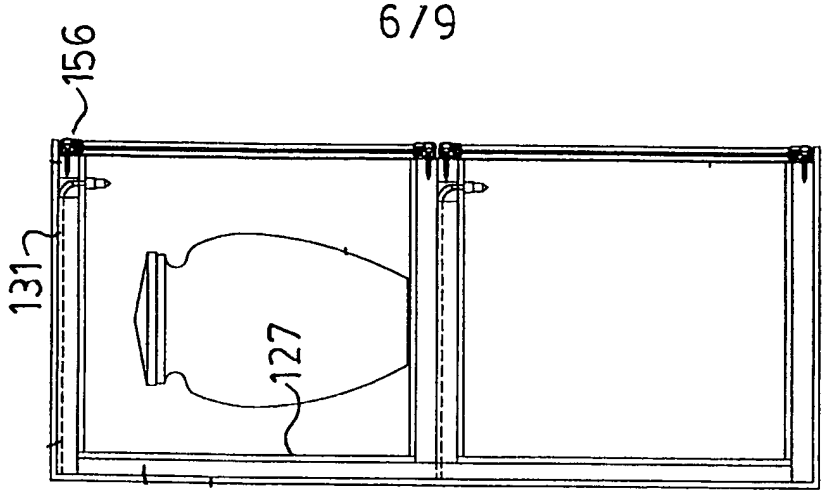


FIG 8

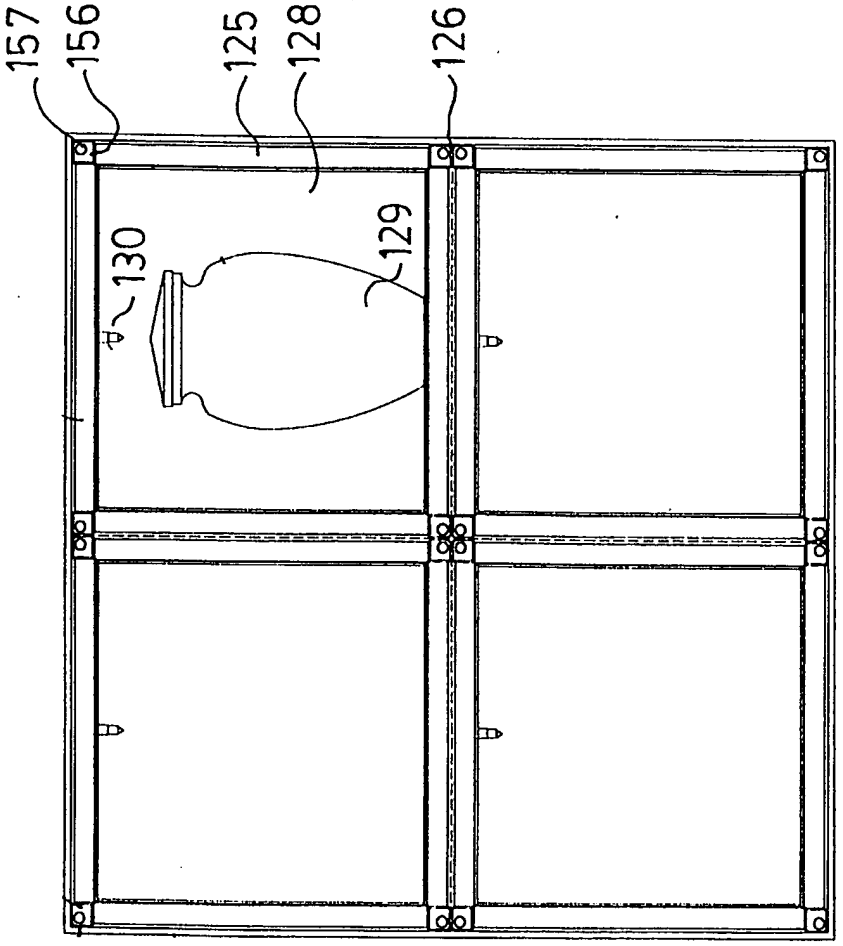


FIG 7

FIG 10

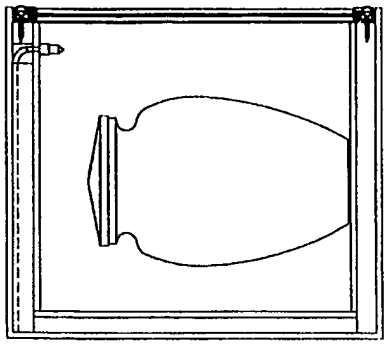
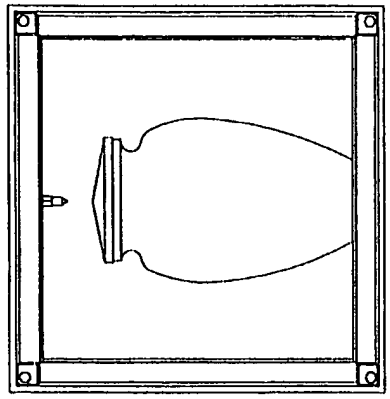


FIG 9



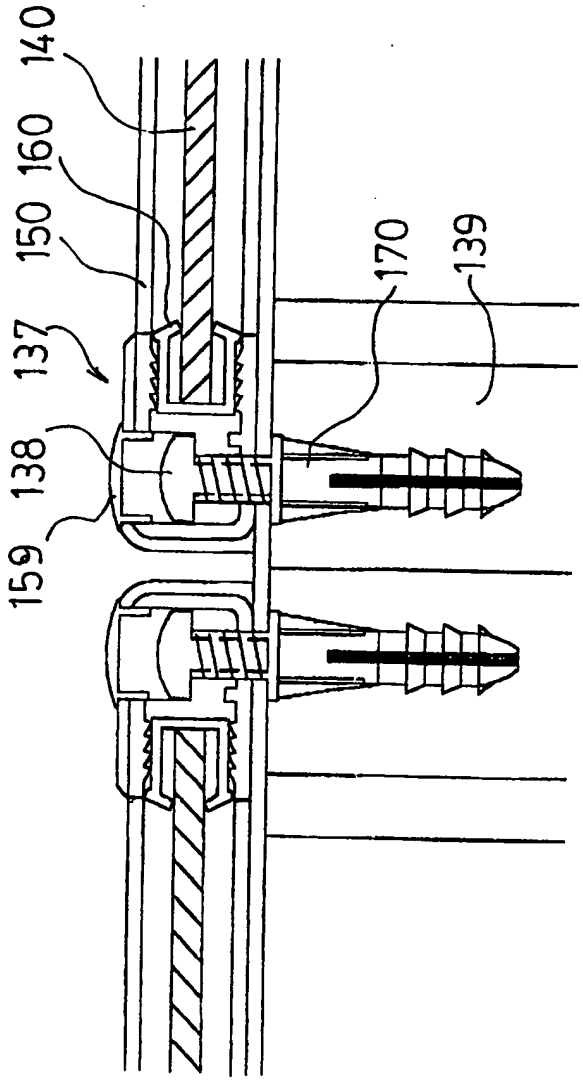


FIG 11

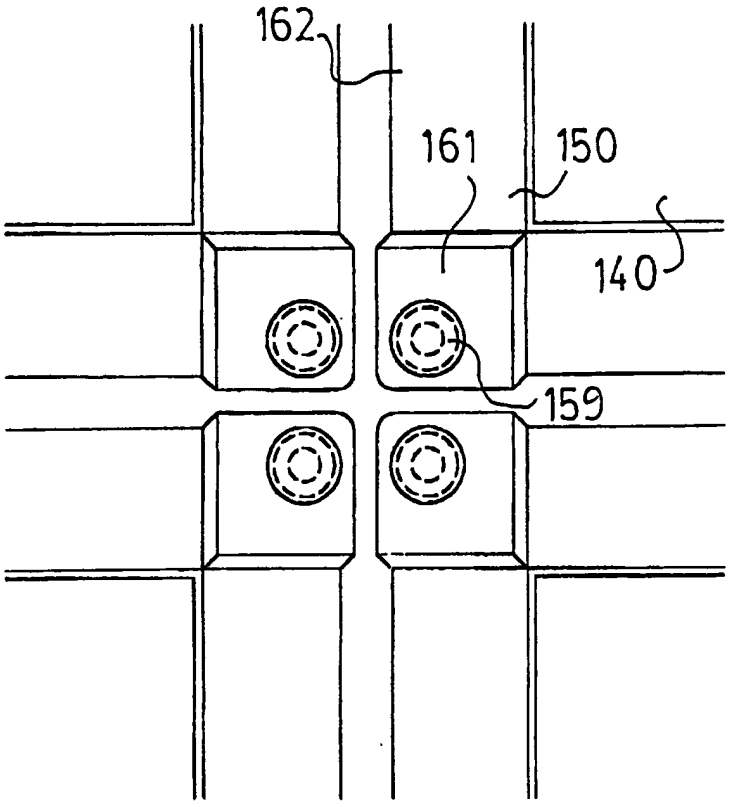


FIG 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 99/00108

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: E04H 13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPAT and JAPIO: niche#, columbari:, ash:, mausoleum, cremator:, module#, modular:, adjust:, plastic:, pvc etc

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5477594 A (LePage) 26 December 1995 See abstract, col 1 lines 21 - 26, col 2 line 51 - col 3 line 25, col 4 lines 26 - 27, col 4 lines 62 - 67	1 - 9
X	US 3841726 A (Andros & Lukitsch) 15 October 1974 See abstract, Figure 2, col 3 line 6 - col 4 line 18	1 - 9
X	US 4614066 A (Koppenberg) 30 September 1986 See abstract, Figures 3 - 6, col 3 lines 3 - 50, col 4 line 54 - col 5 line 12	1 - 9

[X] Further documents are listed in the continuation of Box C

[X] See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search	Date of mailing of the international search report
17 March 1999	14 MAY 1999
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International application No. PCT/AU 99/00108		
C (Continuation). **DOCUMENTS CONSIDERED TO BE RELEVANT**		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3754805 A (Pangburn) 28 August 1973 See abstract, Figure 1, col 2 lines 41 - 63	1 - 4, 8
X	US 5287603 A (Schorman) 22 February 1994 See abstract, Figures 1 and 4	1 - 4, 8

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU 99/00108

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	3841726	AU	66897/74	JP	50001872
					END OF ANNEX